Shock Absorber for Trial/ Off-Road

36DR1

Owner's Manual

ÖHLINS®
ADVANCED SUSPENSION TECHNOLOGY

1 INTRODUCTION

Öhlins Racing AB - The Story

It was the 1970's, a young man named Kenth Öhlin spent most of his spare time pursuing his favourite sport: motocross.

A careful observer, Kenth's attention was continually drawn to one specific detail - motocross bikes had more engine power than their suspension could handle. It was not long before Kenth realised that better performance could be achieved by improved wheel suspension.

Öhlins Racing was established in 1976, and just two years later the company won its first World Championship title. Despite being in the business for 30 years, the search for perfection and new functions is still the main focus of the company.

Congratulations! You are now the owner of an Öhlins Shock Absorber. More than two hundred World Championships and other major world titles are definitive proof that Öhlins shock absorbers offer outstanding performance and reliability.

Every product has gone through rigorous testing and engineers have spent thousands of hours, doing their very best to use every possible experience from our 30 years within the racing sport.

The product that you now have in your possession is pure racing breed that is built to withstand.

By installing this shock absorber on your vehicle you have made a clear statement… you are a serious rider with a focus on getting the maximal handling ability and outstanding feedback from your vehicle. Along comes the fact that your shock absorber will be a long lasting friend, delivering the very best of comfort and performance every time you go for a ride. Go explore!

General Warnings

Note!
The shock absorber/front fork/steering damper is an important part of the vehicle and will affect the stability.

Note!
Read and ensure you understand the information in this manual and other technical documents provided by Öhlins, before using the product.

Note!
Öhlins Racing AB can not be held responsible for any damage to the shock absorber/front fork/steering damper, vehicle, other property or injury to persons, if the instructions for mounting, usage and maintenance are not followed exactly.

⚠ Warning!
After installing the Öhlins product, take a test ride at low speed to ensure your vehicle has maintained stability.

⚠ Warning!
If the suspension makes an abnormal noise, or the function is irregular, or if you notice any leakage from the product, stop the vehicle immediately and return the product to an Öhlins Service Centre.

⚠ Warning!
The product warranty shall only apply if the product has been operated and maintained in accordance with recommendations in this manual. If you have any questions regarding usage, service, inspection and/or maintenance please contact Öhlins.

Note!
When working with the Öhlins product, always read the Vehicle Service Manual.

Note!
This Manual shall be considered a part of the product and shall therefore accompany the product throughout its life cycle.

SAFETY SYMBOLS

In this manual, mounting instructions and other technical documents, important information concerning safety is distinguished by the following symbols:

⚠
The Safety Alert Symbol means: Warning! Your safety is involved.

⚠ Warning!
The Warning Symbol means: Failure to follow warning instructions can result in severe or fatal injury to anyone working with, inspecting or using the shock absorber, or to bystanders.

Caution!
The Caution Symbol means: Special precautions must be taken to avoid damage to the shock absorber.

Note!
The Note Symbol indicates information that is important regarding procedures.

Product Specific Warnings

⚠ Warning!
This product was developed and designed exclusively for a specific vehicle model and shall only be installed on the intended vehicle model in its original condition as delivered from the vehicle manufacturer.

⚠ Warning!
This product contains pressurized nitrogen gas (N_2). Do not open, service or modify this product without proper education (authorized Öhlins dealer/distributor) and proper tools.

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4 DESIGN AND FUNCTIONING

Many of Öhlins suspensions are high pressure monotube type shock absorbers. The fluid is put under gas pressure and the gas and the fluid are kept apart by a separating piston. The piston is usually fitted in an external reservoir, connected by a hose (Fig. 4) or fixed directly on top of the shock absorber (Fig 3). In some models everything is fitted inside the main shock absorber (Fig 2).

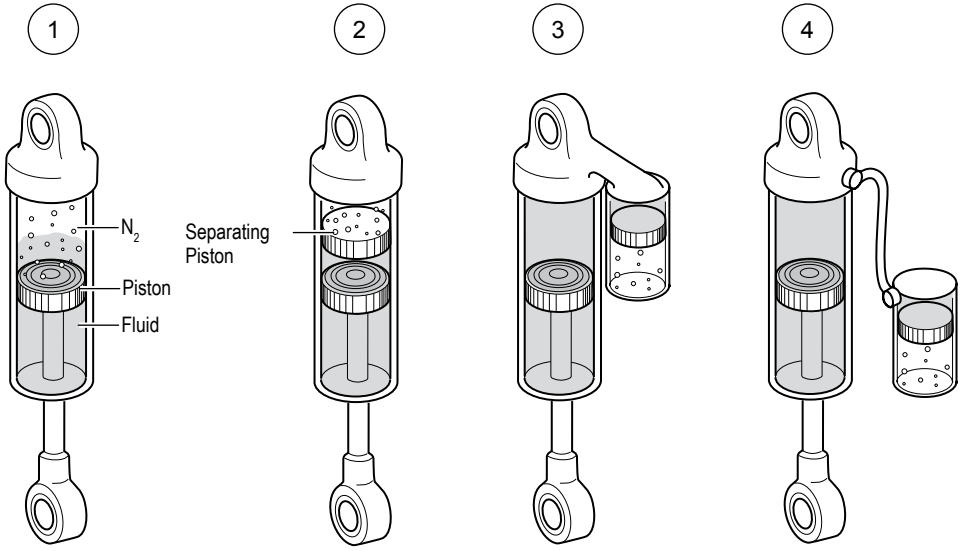
A few shock absorbers are of emulsion type, oil and gas mixed inside the shock absorber (Fig 1). The fluid is pressurized by nitrogen. The pressurisation prevents cavitation of the fluid and the shock absorbing action is therefore more even. The external reservoir also contributes to better cooling of the fluid, giving longer service life for the fluid as well as the components.

Öhlins shock absorbers with external rebound adjustment have an integrated temperature compensation.

As the temperature increases and the fluid flows more easily the flow is controlled accordingly. The shock absorbing effect is therefore independent of the temperature.

The more advanced models permit individual adjustment of compression and rebound damping.

Öhlins shock absorbers provide the possibility of adjustment, making them adaptable to most vehicles, drivers and ranges of use. All of the shock absorbers with springs have adjustable preload of the spring action.



Fluid is forced through needle valves at a low rate of flow (Fig 6) and through a number of orifices in the piston (Fig 7) at a high rate of flow. The flow through these orifices is regulated by shims (thin steel washers) that at high pressure are deflected to open for the fluid. On most models the needle valve can be adjusted from the outside.

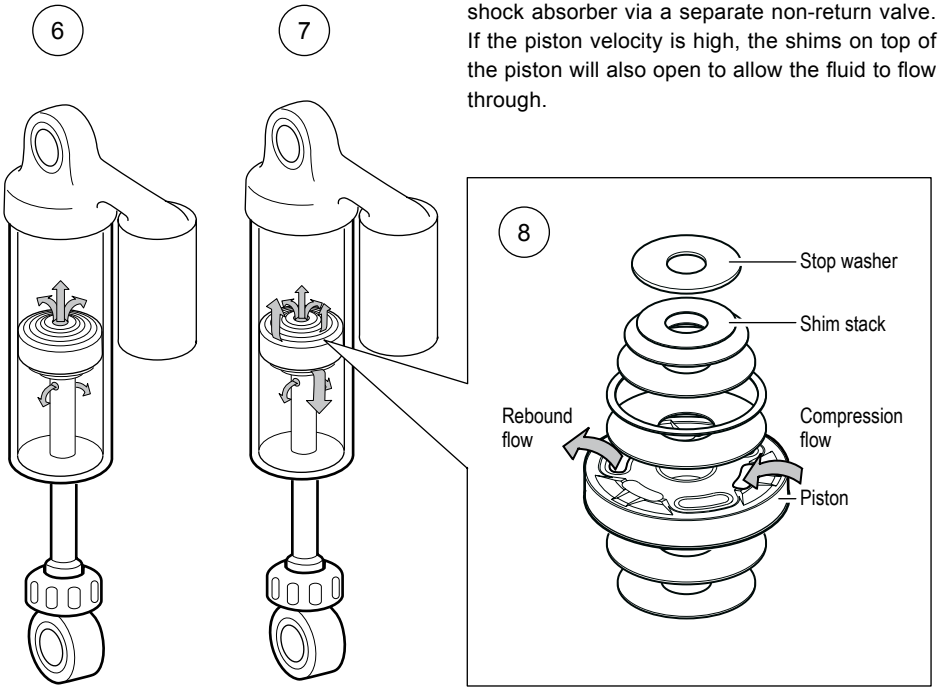
By altering the size of the shim-stack (Fig 8) (i.e. number, thickness, diameter) the characteristics of the damping action can be changed. This should only be done by an authorized Öhlins service workshop.

Compression damping

When movement of the motorcycle causes compression of the shock absorber, the fluid flows through the needle valve (combined compression and rebound valve) in the piston rod. If the velocity of the compression movement is high, i.e., in the case of rapid compression, this will not be sufficient and consequently the shims underneath the piston will open to allow for a greater rate of flow. The fluid that is displaced by the volume of the piston rod is forced into the external reservoir via a separate compression valve. The separating piston is displaced, thus increasing the gas pressure.

Rebound damping

When the spring forces the shock absorber to extend again, the fluid flows back through the needle valve. The fluid flowing into the chamber is forced by the pressure of the gas back into the shock absorber via a separate non-return valve. If the piston velocity is high, the shims on top of the piston will also open to allow the fluid to flow through.



⚠ Warning!

Before riding, always ensure that the basic settings made by Öhlins are intact. Take notes, adjust in small steps and make only one adjustment at a time.

STEP 1

Spring Preload - Sag - Ride Height

Spring preload is a crucial part of setting your motorcycle since it affects the height of the motorcycle and the fork angle.

👁 Note!

The following procedure should be performed on a flat surface.

Put the motorcycle on a workstand so that both wheels are off the ground and the suspension is unloaded.

1. Mark, for example with a piece of tape, a point immediately above the rear wheel axle.
2. Measure the distance from the marked point to a fixed point, for example the wheel axle. (R1)
3. Measure the distance from the bottom of the lower triple clamp to a fixed point, for example the front wheel axle. (F1)
4. Put the motorcycle on the ground so that the front and the rear suspensions are slightly compressed. Repeat the measuring procedures. (R2 and F2)
5. Sit on the motorcycle in normal riding position, properly outfitted in your riding gear. Repeat the measuring procedures. (R3 and F3)

Recommended Measures

If no other recommendations are given in the Mounting Instructions follow the measures below:

Free sag (R1-R2), (F1-F2)

Rear	Trial	20-25mm
Front	Trial/Off-Road	10-15mm

Ride height (R1-R3), (F1-F3)

Rear	Trial	65-75mm
	Off-Road	40-45% of total stroke
Front	Trial	50-60mm
	Off-Road	30-35% of total stroke

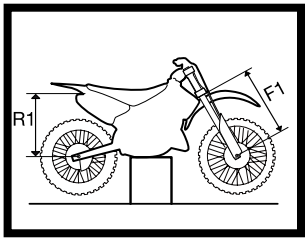
STEP 2

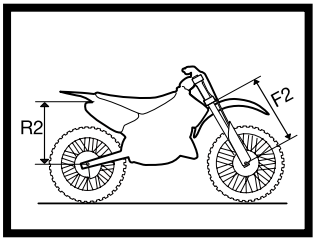
Adjust spring preload

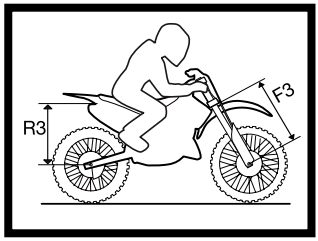
1. If your measures differ significantly from the recommendations in the Mounting Instructions or from the table above, adjust the spring preload. (See section Spring Preload in this manual).
2. If the ride height still differs from the recomendations, you may need to change spring. Contact Öhlins for advice.

⚠ Warning!

Incorrect spring rate may produce a fork angle that is too steep or too flat. This in turn will give a tendency for over- or understeering, which could seriously affect the handling characteristics of the motorcycle.







Spring Preload

When adjusting the spring preload you move the spring seat. This will lower or raise the motorcycle ride height.

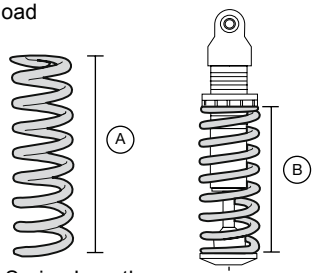
The spring preload is fundamental for the function of the suspension. If the preload is incorrectly set, any other adjustments will not help to get the intended performance from the suspension.

Set Spring Preload

Use a C-spanner.

1. Unlock the lock nut (1A).
2. Turn the spring platform nut (1B) to set the spring preload.
3. Lock the setting with the lock nut (1A).

Spring Preload



A Free Spring Length
B Installed Spring Length
A-B = Spring Preload
Spring Preload is the difference between the measures A and B.

Rebound Damping Adjuster

Rebound damping controls the energy absorption when the shock absorber is being extended and controls how fast the shock absorber returns to its normal position after being compressed.

Adjust Rebound Damping

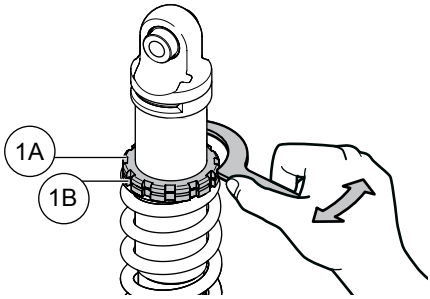
Turn the adjuster clockwise to increase damping. Turn the adjuster counter clockwise to decrease damping.

Most of the adjusters have definite positions with a noticeable “click”, which makes it easy to count to the right setting.

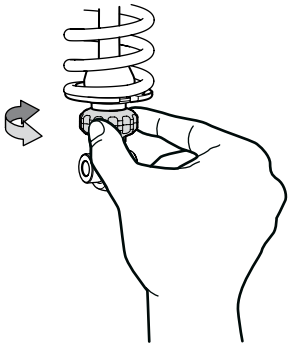
Note!

If you cannot feel the “clicks” on the rebound knob, the shock absorber must be inspected by an authorized Öhlins service workshop. It could be due to low gas pressure or lack of oil.

Set Spring Preload



Adjust Rebound Damping



Problem

The rear suspension feels "slow", difficulties jumping over obstacles.

Possible cause

Too much damping in the rear suspension, or the spring does not have enough pre-load.

Try one of the following

→ Decrease damping
→ Increase spring pre-load

Problem

The rear suspension is always moving, causing the bike to act unstable and loose traction too easy.

Possible cause

The rear damping is insufficient.

Try one of the following

→ Increase damping
→ The shock absorber damping is lost, caused by low pressure or lack of oil. Authorized service required.

Problem

The bike does not turn tightly enough. Steering feels "lazy".

Possible cause

Too much rear sag, i.e. the rear ride height is too low.

Try one of the following

→ Increase rear pre-load
→ Mount harder spring
→ Decrease front ride height. Slide the forks up 3-5mm through the clamps
→ Rider's weight distribution predominantly towards the rear of the vehicle. Handle bar position too far towards the rear.

Problem

The front of the bike wants to tuck when turning, or, the bike steers too fast and seems "nervous".

Possible cause

Not enough rear sag, i.e. the rear ride height is too high.

Try one of the following

→ Decrease rear pre-load
→ Mount softer rear spring
→ Increase front ride height. Slide the forks down 3-5mm through the clamps
→ Rider's weight distribution predominantly towards the front of the vehicle. Handle bar position too far towards the front.

Problem

The rear suspension is bottoming too harshly.

Possible cause

The rear suspension is too soft or the bump rubber damaged.

Try one of the following

→ Increase damping
→ Mount harder spring
→ Check bump rubber and replace if necessary

8 INSPECTION AND MAINTENANCE

Preventive maintenance and regular inspection reduces the risk of functional disturbance. If there is any need for additional service, please contact an authorized Öhlins workshop.

Cleaning

Clean the shock absorber externally with a soft detergent. Use compressed air. Be careful that all dirt is removed. Lift the bump rubber and clean the area below. Keep the shock absorber clean and spray it with oil (WD40, CRC 5-56 or equivalent) after washing. Wipe off excessive oil with a cloth.

Caution!

Never spray water directly into the adjuster knobs and/or the ball joints.

Inspection

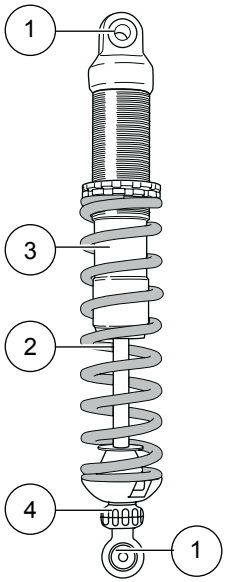
1. Check ball joints for possible excessive play or stiction.
2. Check the piston shaft for leakage and damage.
3. Check the shock absorber body for external damage.
4. Check for excessive wear of rubber components.
5. Check the attachment points of the shock absorber to the vehicle.

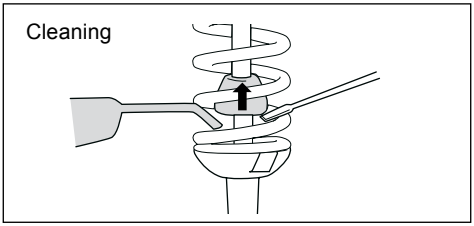
Recommended Service Intervals

After 50hrs of use or
1 time/year

Disposal

Discarded Öhlins products shall be handed over to an authorized Öhlins workshop or distributor for proper disposal.





Note!

The Öhlins shock absorber shall only be filled with the Öhlins Shock Absorber Fluid. Contact an Öhlins dealer for advice.

Warning!

Never change gas pressure. Special purpose charging equipment and access to nitrogen and special knowledge is required.

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